Python

Conditionals and Loops

@kabirbaidhya

Reflections

What we already know

From the last session.

1. Lists
2. Dictionaries

Note: If you're not aware of these. Read them at https://github.com/kabirbaidhya/learn-python-django-web

Conditional Statements

Conditional Statements

- The basic building blocks of every programming language.
- Every language offers them in one way or another.
- In Python the simplest of conditional statements is the `if` statement.

The `if` statement

```
if CONDITION:
    STATEMENT1
    STATEMENT2
    ...
```

The `CONDITION` could be any valid expression that results boolean value.

The statements inside the block are run only if the `CONDITION` holds true else the indented code block will be ignored.

Don't Forget

1. The colon `:` in the `if` block, which actually starts the block.
2. Indentation, which is the part of syntax in python and a must have (unlike C-style languages where it's optional).
3. End of indent means end of the block.

Example 1

```python
if input('word: ') == 'Foo':
    print('Great!')
    print('You entered "Foo"')

# Normal statements out of the block
print('Good Bye!')
```

The `if-else` statement

```
if CONDITION:
    STATEMENT1
    STATEMENT2
    ...
else:
    STATEMENT1
    STATEMENT2
    ...
```

The statements inside the `if` block are run if the `CONDITION` holds true otherwise the code from the `else` block will be run.

Only either one of these two blocks are run.

Example 2

```python
if input('word: ') == 'Foo':
    print('Great!')
    print('You entered "Foo"')
else:
    print('Hey!')
    print('That was something else')

# Normal statements out of the block
print('Good Bye!')
```

The `if-elif-else` statement

```
if CONDITION1:
    STATEMENTS

elif CONDITION2:
    STATEMENTS

elif CONDITION3:
    STATEMENTS
...
else:
    STATEMENTS
```

The `if-elif-else` statement

- Conditions are checked one by one, and the first code block for which the condition results `True` will be executed and all other blocks are skipped.
- If none of the conditions holds true, the `else` block is executed. And if there isn't any `else` block, nothing happens.
- There can be any number of `elif` blocks. But only one of the block is run no matter what.
- **Remember it is `elif`, not `elseif`**

Example 3

```python
word = input('word: ')

if word == 'Foo':
    print('Great!')
    print('You entered "Foo"')
elif word == 'Bar':
    print('Wow!')
    print('You entered "Bar"')
elif word == 'Baz':
    print('Awesome!')
    print('You entered "Baz"')
else:
    print('Hey!')
    print('That was something else')

# Normal statements out of the block
print('Good Bye!')
```

Loops

Loops in Python

Loops are the programming constructs that allow us execute or iterate over a statement block multiple times depending upon some condition.

Generally we use two types of loops in python:

1. While Loop
2. For Loop

The `while` loop

It's the simplest of all.

Syntax

```
while CONDITION:
    STATEMENTS
```

It iterates over a block of code as long as the base condition holds true.

Example 4

```python
a = 0

# This will print out numbers 1 to 5
while a < 5:
    a = a + 1
    print(a)
```

Example 5

```python
n = 0
sum = 0

# Calculate the sum of 5 numbers entered by user
while n < 5:
    value = input('Enter Number %s: ' % (n + 1))
    sum = sum + float(value)
    n += 1

print('Sum = %.2f' % sum)
```

Example 6

```python
# Print Fibonacci series upto n
a = 0
b = 1
n = 25

while a < n:
    print(a)
    (a, b) = (b, a + b)
```

Example 7

```python
# Lists and the while loop
names = ['John Doe', 'Jane Doe', 'Johnny Turk']
i = 0
total_names = len(names)
print('Users:')

while i < total_names:
    end = ' and\n' if i == total_names - 2 else '\n'
    print(' - %s' % names[i], end=end)
    i += 1
```

The `for` loop

Loop dedicated for iterating over a sequence types.

Syntax

```
for VARIABLE in SEQUENCE:
    STATEMENTS
```

Iterates over the given sequence `SEQUENCE`.

The `VARIABLE` would hold the current item over each iteration of the loop.

Example 8

```
# Loop over a list of numbers

for num in [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]:
    print(num)

print('--')

# Do the same thing using range.
for num in range(10):
    print(num + 1)
```

Example 9

Redoing the last `while` example with `for` loop.

```
# Lists and the for loop
names = ['John Doe', 'Jane Doe', 'Johnny Turk']
print('Users:')

for name in names:
    end = ' and\n' if name == names[-2] else '\n'

    print(' - %s' % name, end=end)
```

Index in the `for` loop

Use `enumerate()` to get a tuple `(index, value)` instead of regular item of sequence.

```python
names = ['John Doe', 'Jane Doe', 'Johnny Turk']


for (index, value) in enumerate(names):
    print(' %d \t %s' %(index, value))
```

Loop over dictionaries

Use `dict.items()` method to get a list of tuples for each key value pair in the dictionary.

```python
user = {
    'name': 'John Doe',
    'email': 'johndoe@example.com',
    'phone': '(111) 111-1112',
    'address': '123 6th St. Melbourne, FL 32904',
}

for (key, val) in user.items():
    print(' %s : %s' % (key, val))
```

Exercises

Exercise 1

1. Program to ask for the age of the person and print out the following depending upon the age.

Age	Message
Less than or is Zero	Invalid input for age.
Less than 1 year	You're an infant
2 - 12	You're just a kid.
13 - 19	You're a teenager.
20 - 45	You are adult now.
46 - 59	You are middle-aged.
60+	You are old now.
120+	You're too old to still be alive.

Exercise 2

Program to ask for a co-ordinate point `(x, y)`. And print in which quadrant it lies in. If it lies in any axes print the name of the axis instead. For eg: `(5, 0)` should print `'X-Axis'` but `(5, - 5)` should print `'4st Quadrant'`.

Exercise 3

Program to calculate the factorial of integer `n` taken from user input.

Exercise 4

Program to store a list of several users with information: username, email and password. Ask user name and password from the user and check if the combination of username/password matches with the credentials we have in our predefined list.

Read More?

Links

1. https://docs.python.org/3/reference/compound_stmts.html
2. http://www.openbookproject.net/books/bpp4awd/ch04.html
3. http://en.wikipedia.org/wiki/Conditional_(programming)
4. http://anh.cs.luc.edu/python/hands-on/3.1/handsonHtml/ifstatements.html

More Links

5. https://en.wikibooks.org/wiki/Python_Programming/Conditional_Statements
6. https://docs.python.org/3/reference/expressions.html#conditional-expressions

This slide was a part of course

Python, Django & Web Development

github.com/kabirbaidhya/learn-python-django-web

Thank You

@kabirbaidhya

kabirbaidhya@gmail.com

The slides were created using Marp. https://yhatt.github.io/marp/